What's in the Box? ... Responding to DG container incidents

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WHAT ARE DG?

MARPOL Annex 1
MARPOL Annex 2
IMSB Code
Liquid substance with FP<60C
IGC Code
IBC Code

IMDG Code

HNS
CONTAINERSHIP INCIDENTS: GLOBAL TREND?

TEU capacity of the global container ship fleet as of January 1, 2017, based on nominal TEUs

Number of containership incidents attended by ITOPF

CONTAINERSHIP INCIDENTS: GLOBAL TREND?

TEU capacity of the global container ship fleet as of January 1, 2017, based on nominal TEUs

Average TEU capacity and highest TEU capacity for containership incident attended by ITOPF per year

- Dangerous Goods making ~10-12% of global container trade which is ~6 million or more shipments per annum
**ISSUES AND IMPACTS OF DG SPILLS**

**WHEREAS FOR OIL SPILLS...**

- Different oil types, but some uniformity in properties & behaviour
- Established techniques for response at sea and on the shoreline
- Typical effects on marine environment and livelihoods well known

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**HUMAN HEALTH**

- Shock wave
- Fire
- Oxygen depletion
- Exposure to toxic HNS

**ENVIRONMENT**

- Toxicity
- Bioaccumulation
- Smothering
- Decomposition (anoxia, H2S)

**SOCIO-ECONOMIC**

- Fisheries
- Closure of beaches
- Tourism
- Exclusion zones
VARIETY OF DANGEROUS GOODS

- Can include explosive, flammable, corrosive & toxic compounds
- Dangerous goods can be loaded in bulk or in packaged form
- Containers may have just one substance or have mixed loads
- All IMDG cargoes must be included in a separate manifest

IDENTIFYING DG – DG MANIFEST

- A Dangerous Cargo Manifest should be provided by shipowner or charterer
- Includes details of each cargo, its Proper Shipping Name, its hazards, the quantity, its state & the packaging
- Should also have information on the location of the cargo (stowage position)
- Documents can be very large (100's pages) and level of information can vary

Essential to obtain quickly
PROCESSING THE DG CARGO MANIFEST

Analysis of Shipping Manifest and DG Manifest

Each DG entry need to be analysed with:

1. Products identification & quantity
   - Cargo Manifest
   - UN/CAS number

2. Products characteristics
   - MSDS
   - Guidebooks

3. Fate, Behaviour & Hazards of products
   - Internet websites
   - Guidebooks
   - Software

4. Sensitivities
   - GESAMP
   - Sensitivity database

Identification of missing containers

Cross-reference with stowage plan to confirm location of DG

Prioritisation

Long and tedious process

PROCESSING THE DG CARGO MANIFEST

- SSL KOLKATA (DWT 13,760 T, TEU 1,114), 13th June 2018, off Sundarban biosphere reserve (India)
- 147 on deck lost, including 7 DG
- 310 under deck

457 entries

Always need to check not only the DG manifest but also the rest of the cargo manifest due to possibility of misdeclaration
**MISDECLARATION**

- More than a third of DG boxes are marked incorrectly.

- Between 2014-2017, Gard has been involved in 13 container cargo fire cases of some significance. Almost all of them were associated with cargo being misdeclared. Six cases involved calcium hypochlorite.

- Calcium hypochlorite naturally decomposes and emitting heat. Poor packaging, proximity to heat sources increases the rate of decomposition and can lead to explosion.

- The IG P&I Clubs and the carrier members of the CINS produced a new set of guidelines for the carriage of calcium hypochlorite

- 21% have other defects (weight, quality of packaging...)

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**KEY ISSUES – IDENTIFICATION AND RESPONSE**

**ISSUES**

- Knowledge of the presence of DGs

**IDENTIFIED ISSUES**

- Rise of megaship, leading to high DG number and large DG manifests
- Variety of substances with range of properties, behaviours & hazards
- Misdeclaration, mispackaging

**MITIGATION**

- Electronic means to identify HNS and its locations on board – quick identification and prioritisation.
- Role and involvement of oil industry and chemical industry and salvage
- Pre-identification of expertise
- IMO guidelines to update
- New guidance/changes in legislation following incident
- Always be an issue (exacerbated by larger manifests)

**Major issue in case of fire**

Crew/ responders do not know the best way to extinguish cargo fire or to might put their lives in jeopardy by not having a proper knowledge of the hazards
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**Limited actions available for mitigation of spills from DGs**
MODELLING and REMOTE SENSING
Improvement in detection and modelling – but who will fund it?

RESPONSE FOR DG
- EVAPORATOR
  - Monitor the plume
  - Recovery not possible
- DISSOLVER
  - Monitor only
  - Recovery not possible
- FLOATER
  - Monitor
  - Similarity with oil spill response
  - Containment and recovery
- SINKER
  - Difficult to locate
  - Recovery might be possible

FORECASTING TRAJECTORY OF SPILL PLUME
MONITOR
LIMITED ACTIVE RESPONSE/MITIGATE IMPACT

IMPAIRS
- Gap in environmental impacts of HNS
- More monitoring programs are now implemented after HNS incidents
- Extent toxicity data for salt and blackish waters

MSC CHITRA, MUMBAI, INDIA, AUGUST 2010

- 2,600 MT of IFO 380 on board
- Estimated 800 MT released
- 1,300 containers on board (31 with dangerous goods)
- ~300 containers lost (13 dangerous good)
PUBLIC HEALTH ISSUES

- During salvage, container with Aluminium Phosphide broke open and contents lost to hull/sea
- Contained 4,200 kg AIP: 2,800 x 1.5kg canisters
- Reports received of oiled canisters coming ashore

SAFETY MEASURES

- Air modelling (NCEC) – one broken canister and the whole container load; for workers close to wreck (salvors and fishermen), general public (Vessel 500m from Mumbai city), and for shoreline workers
- Full risk assessment written for all Dangerous Goods and the different shoreline clean up techniques used
- United Phosphorus arrived on site and provided assistance to responders
- Daily sweeps undertaken by MSC and United Phosphorus for all suspicious bottle/canisters – stored in airtight steel box and removed to UP facility for disposal
- Air monitoring undertaken daily before/during work at high risk sites
CONTAMINATION FROM DG CONTAINERS

- Overboard containers increased risk of damage to containers & difficulty of recovery
- Risk of exposure to dangerous goods leaking from containers
- Rarely only HNS pollution: combine with bunker fuel
- All cargoes become hazardous waste when mixed with oil
- Different type of response: Oil, oiled debris and HNS, done usually by the same personnel (oil spill responders), with no or little training for HNS...
- Complicates shoreline clean-up & handling/disposal of waste
- Amount of waste can be very high
- Need of segregation

BARELI, FUQING, CHINA, MARCH 2012

- Containership (2004; 35,881 GT; 3,100 TEU) ran aground on approach to Fuzhou
- Broke her back amidships with a release of bunkers & containers overboard
- 1,190 m3 HFO onboard + 1,397 containers (101 with dangerous goods)
- Estimated release of ≤100 MT HFO & 165 containers (80 with Dangerous Goods)
- ITOPF Technical Advisers on site in Fuzhou from 17th March until 12th May
CONTAINER STORAGE, PROCESSING AND DISPOSAL

- Type of equipment required is huge, not only for salvage but for processing too.
- The logistics: a huge area is required to for decontamination, repackaging, and storage, are football pitch size, that need to be available for period of months.
- Not to forget the waste treatment process after that.
- A fully-trained HAZMAT team should coordinate the operation.
- Correct PPE should be worn at all times (e.g. liquid tight suits & SCBA).
- Goods are typically re-packed or sent for treatment and disposal.

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<td>Limited detection and monitoring capability</td>
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<td>Lack of understanding of the impact</td>
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<td>IMO guidelines to update New guidance/changes in legislation following incident Always be an issue (exacerbated by larger manifests)</td>
<td>Pre-identify temporary storage areas, waste disposal sites, availability of expertise/equipment/specialised contractors</td>
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<td>Pre-identification of expertise</td>
<td>Increase training See IMO modules for training HNS responders</td>
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<td>Funding more R&amp;D research and promote environmental monitoring studies during and after an incident</td>
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CONCLUSION ON RESPONSE TO DG INCIDENT

GROWTH IN CONTAINER SHIPPING
Increased risk? HNS issues? Lengthy salvage/responses?

IMPACTS OF HNS SPILLS
Human health, environment and socio-economic

MONITORING AND RESPONSE OF HNS
Use of adequate equipment, trained personal

DOUBLE TROUBLE…

Thank you for your attention
Any questions?
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